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ABSTRACT

A study compared the average reading ability levels of freshmen enrolled at an open-door community college with the readability levels of eight content area textbooks used in courses at the institution. Subjects, 100 students enrolled in reading courses, were randomly selected and administered the Nelson-Denny Reading Test to determine reading ability. Readability levels of the content area textbooks were calculated using the Fry Readability Formula and Graph. Results indicated that the readability levels of the eight textbooks were above the mean reading score of the students tested. Findings suggested that the students would experience difficulty with their texts and would need teacher assistance as they read. Findings also suggested that reading strategies--such as SQ3R, reading with a definite purpose, and asking questions while reading--should be taught, and that guided reading lessons should be tried. In addition, developmental reading courses, especially those that include textbook reading techniques, should be continued. (Tables of data and references are attached.) (NKA)

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An Analytical Comparison of Reading Levels of Junior College Students with the Readability Levels of Textbooks Used in Content Area Courses

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An Analytical Comparison of Reading Levels
of Junior College Students with the
Readability Levels of Textbooks Used in Content Area Courses

Reading textbooks is a major part of the college experience. Students often complain that textbooks are too difficult, and instructors have certainly experienced students' lack of success with reading assignments. Textbooks contain information which must be read, learned, and, in many cases, reproduced. Textbooks vary from course to course, and the reading ability levels of students who are assigned the books also vary, especially among students served by schools with open-door admissions policies. Students attending open-door schools have wide ranges of interests and abilities. Included among these is the ability to read.

Ideally, students who have been graduated from high school should have the ability to read at the 13th grade level. This, however, is often not the case. Presented herein are the results of a study which sought to compare the average reading ability levels of freshmen enrolled at an open-door public junior college with the readability levels of eight content area textbooks. The textbooks selected include those used in classes where outside reading is assigned and lectures typically support and supplement material introduced in a basal textbook. A knowledge of reading levels and readability levels can be helpful to teachers in understanding students' experiences and frustrations and in preparing instruction to more effectively serve the needs of students having difficulty mastering course content.

Review of Related Literature

The concept of readability has existed for more than 60 years. Thorndike (1921) mentioned readability, placing emphasis on the number of

"difficult" words in a selection to indicate readability for a group of readers. The concept of "word difficulty" was based on the relative frequency of appearance on a list of words. Lively and Pressey (1923) constructed a readability formula based on the premise of word difficulty in terms of frequency.

Gray and Leary (cited in Singer, 1983) were the first to find that word frequency and sentence length were determinants of text difficulty. Almost all readability formulas use these two criteria. The most common factors of vocabulary and average sentence length are integral parts of modern formulas which attempt to measure the difficulty of reading materials (Chall 1957, Klare 1974-75, Harris 1976, Shepherd 1982, Robinson 1983). Dale-Chall (1948), Flesch (1951), and Fry (1968) are widely accepted formulas using these factors.

Readability formulas, while having limitations, can best be thought of as useful guides in matching students to textbooks (Shepherd 1982, Marshall 1979, Standal 1978, Estes and Vaughn 1978). Having knowledge of readability levels of textbooks, then, can assist teachers in preparing and delivering instruction to students in courses where a textbook is a major resource. Campbell (1979) noted the need for teacher assistance to students as they read content texts.

Of the three formulas mentioned above, all valid and reliable, the Fry formula is used frequently because of its easy-to-use procedures. Fry's procedure states that three 100-word passages be randomly selected from a textbook; the average number of sentences be determined; the average number of syllables be determined; and the Fry Graph be used to plot the

intersection of average number of syllables and sentences. Fry (1977), through minor adjustments and extrapolation, extended his graph to specific grade level designations of 13 to 17+. Longo (1982) validated the Fry Graph at the college level.

Readability studies have been conducted at the postsecondary level. Cline (1971) found that 52% of students at a community college had reading levels below the readability levels of textbooks they were assigned. The mean reading grade level for students was 12.6, while the mean readability grade level of textbooks was 13.0.

McClellan and McClellan (1973) conducted a similar study. Using the Nelson-Denny Reading Test, which gives grade equivalent scores in vocabulary and comprehension as well as a total score, students were found to have a mean vocabulary score of 12.9 and a mean comprehension score of 11.1. Of 13 textbooks surveyed, five had readability levels of 16+, four were between 13 and 15, three were between 11 and 12, and one was between 7 and 8.

Bertalan (1976) found a mean reading grade level of 12.4 for students and 11.3 for textbooks at a community college. Bertalan randomly selected 375 students for his study, and sample means were found to approximate population means.

Johnson (1980) found a mean reading level of 12.8 for 170 students enrolled in the general education program at a community college. The ten textbooks in her study ranged in difficulty from 7.0-17+, with 70% of the students reading below the arithmetic mean readability of the textbooks used.

Levy and Dixon (1982) found the overall average of textbook readability was at the college sophomore level. Of 1,207 students tested, 34% read at or below the 12th grade level.

Data Presentation

One hundred freshmen enrolled in reading courses were randomly selected and administered the Nelson-Denny Reading Test to determine reading ability levels. The mean reading level was found to be 8.78 with a standard deviation of 2.83. Using the normally curved distribution, approximately 68% of the students tested were found to have reading levels between 5.95 and 11.61 (±1 standard deviation from the mean, $\overline{X}$). Table One depicts the frequency and cumulative frequency distribution of the reading levels of students tested.

Readability levels of eight content area textbooks were determined using the Fry Readability Formula and Graph. The courses include those in which the textbook is the primary resource. Specific courses are BUS 100 (Introduction to Business), CIS 190 (Introduction to Computers), BIO 101 (General Biology I), CHM 101 (Introduction to General Chemistry), HIS 123 (World History I), HIS 202 (American History II), PSY 200 (General Psychology), and SOC 200 (Introduction to Sociology). The content areas of business, natural sciences, history, and social sciences include a large percentage of undergraduate majors on any campus. Table Two presents the data regarding textbooks.

Conclusions

The data presented show that the readability level of each of the eight textbooks is above the mean reading score of the students tested. The actual

Table One

Frequency Distribution of

Nelson-Denny Reading Test Scores, 1986

Grade Level	Frequency	Cumulative Frequency
16.0-16.9	1	100
15.0-15.9	1	99
14.0-14.9	1	98
13.0-13.9	5	97
12.0-12.9	9	92
11.0-11.9	9	83
10.0-10.9	8	74
9.0- 9.9	11	66
8.0- 8.9	9	55
7.0- 7.9	18	46
6.0- 6.9	12	28
5.0- 5.9	9	16
4.0- 4.9	5	7
3.0- 3.9	2	2
TOTAL	100	

n=100

$\overline{X}$=8.78

range of students' reading levels was 12.9 (16.6-3.7); the textbooks had a range of 5 grade levels. The sample mean ($\bar{X}$) reading level was 8.78; the median reading level was 8.4; the modal reading levels were 7.0, 7.4, and 7.5. Graphically, the data would appear slightly positively skewed, with more scores closer to the lower end.

In light of the above data, it can be expected that students will experience a good amount of difficulty with their textbooks. This can best be overcome by following the advice of Campbell (1979, supra), i.e., providing teacher assistance to students as they read textbooks. It is not a recommendation that books with easier readability levels be selected. Rather, students should be taught to use textbook reading strategies like SQ3R, to read with a definite purpose, to ask questions while they are reading, and to practice reading from a wide variety of sources to look for main ideas and supporting details. Teachers can assist by pre-teaching vocabulary, showing how to get information from specific content textbooks, and using guided reading lessons.

In addition, developmental reading courses should be continued. These courses often focus on vocabulary development and reading comprehension skills that include finding the subject and main idea of paragraphs and passages. Further, these courses should include units on textbook reading techniques and questions that students should ask when interacting with printed material.

Table Two

Readability Levels of

Selected Content Area Textbooks

Course	Textbook	Readability Level
BUS 100	Business: Its Nature and Environment, Southwestern Publishing Company, 1984	17+
CIS 190	Introduction to Computers and Information Processing, Prentice-Hall, Inc., 1984	17+
BIO 101	Elements of Biological Science, Norton Publishing Company, 1983	12
CHM 101	Basic Concepts of Chemistry, Houghton Mifflin Company, 1984	10
HIS 123	World Civilizations, W.W. Norton Publishing Company, 1982	13
HIS 202	The American Pageant, D.C. Heath Company, 1983	12
PSY 200	Psychology: The Science of People, Prentice-Hall, Inc., 1984	13
SOC 200	Sociology, Harper and Row Company, 1981	14

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